ASPECT-ENTERPRISE

Virtual Appliance Installation Guide

Cylon

SMART ENERGY CONTROL

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ASPECT-Enterprise (MAN0126 rev 9)

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www.cylon.com
www.cylon-automatrix.com

Style conventions used in this document:

UI Text: Text that represents elemets of the UI such as button names, menu options etc is presented with a grey background and border, in Tahoma font which is traditionally used in Windows UIs. For example:

Ok

Standard Terms (Jargon): Text that is not English Language but instead refers to industry standard concepts such s Strategy, BACnet, or Analog Input is represented in slightly condensed font. For example:

BACnet

Code: Text that represents File paths, Code snippets or text file configuration settings is presented in fixed-width font, with a grey background and border. For example:

```
$config_file = c:\CYLON\settings\config.txt
```

Parameter values: Text that represents values to be entered into UI fields, or displayed in dialogs is represented in fixed-width font with a shaded background. For example

10°C

Product Names: Text that represents a product name is represented in bold coloured text. For example

CBX-8R8-H

PC Keyboard keys: Text representing an instruction to press a particular key on the keyboard is enclosed in square brackets and in bold folt. For example:

[Ctrl]+[1]

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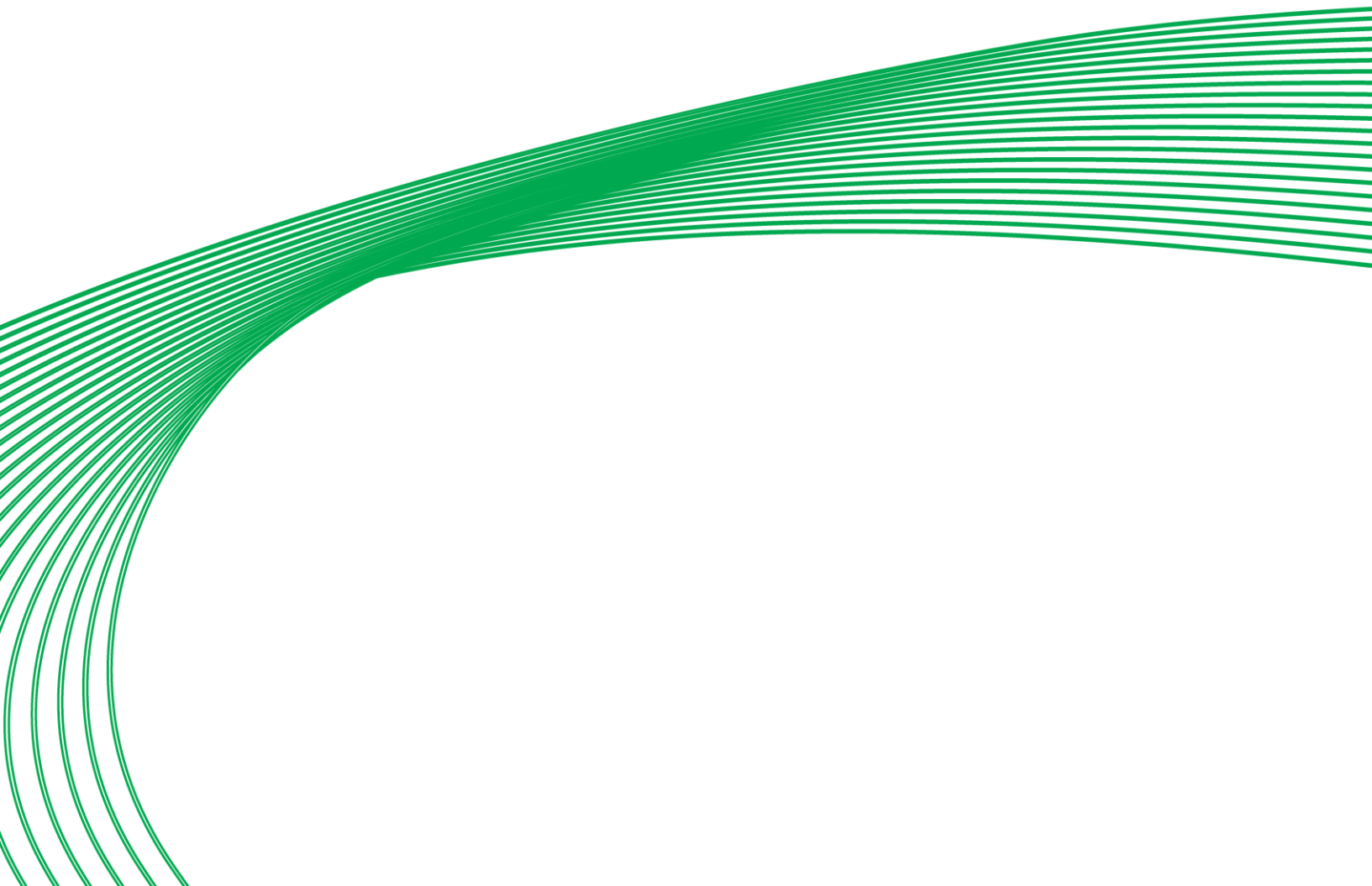
SECTION 1 : INTRODUCTION



This document provides details on the software installation and configuration of **ASPECT®-Enterprise** Virtual Appliance. The information found within reviews information regarding deployment of VM images, as well as target administration of the **ASPECT-Enterprise** itself. Please review this document carefully before proceeding.

Considerations Prior To Implementation

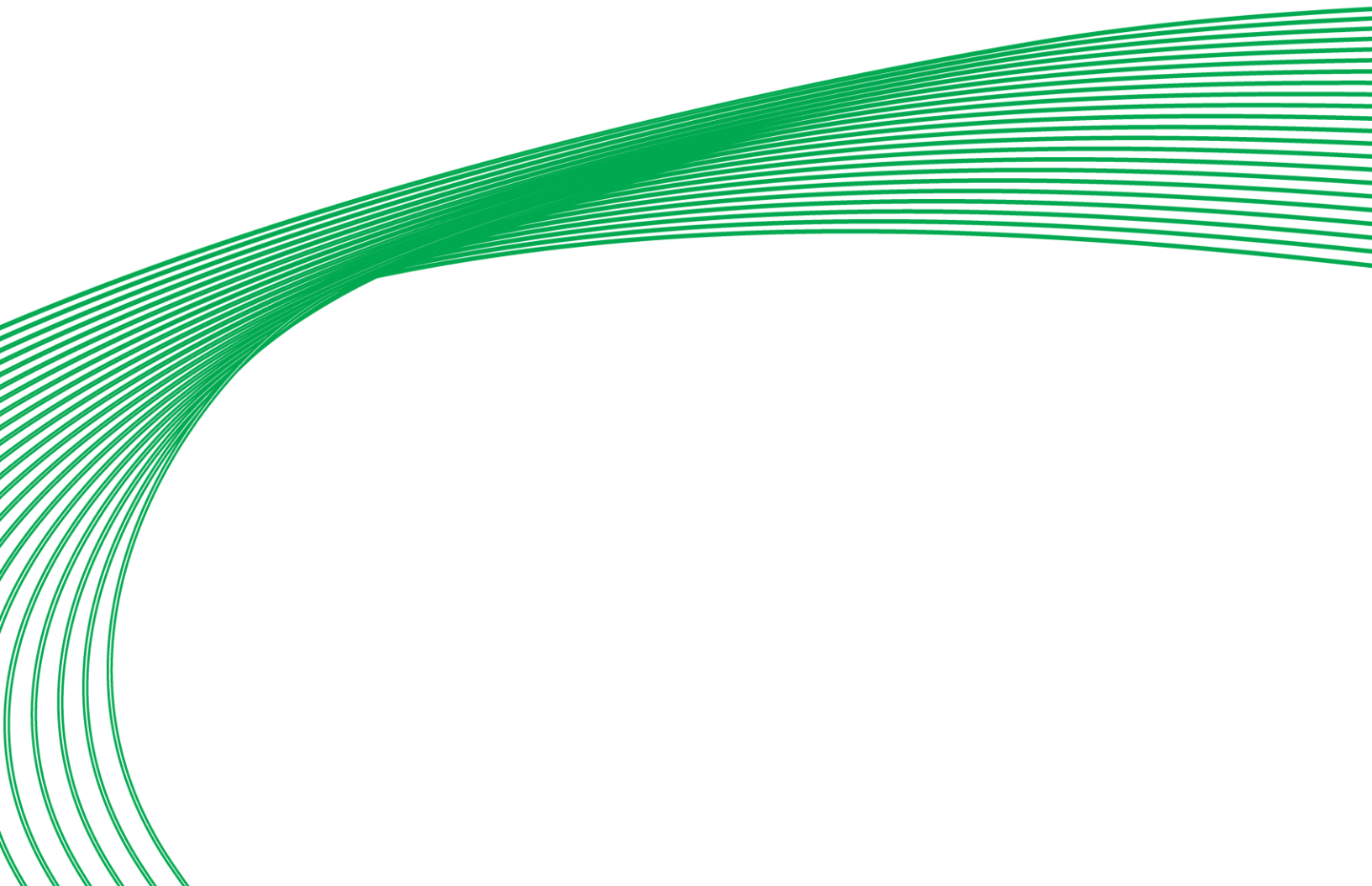
To properly prepare for installation and deployment of **ASPECT-Enterprise** for Virtual Machines, please take the following considerations into account:

1. **ASPECT®** provides world-class server-based **BAS** solutions developed by Cylon and is routinely updated to include new features and enhancements to its technology. Regardless of whether or not you are deploying the virtual machine for the first time, please check to ensure you have the latest virtual machine images for **ASPECT-Enterprise**. If you are a building owner, please contact your Cylon Solution Integrator for assistance. If you are a Cylon Solution Integrator, please contact Cylon Technical Services by visiting the Cylon Toolbox and verifying product revisions.
2. Recommended System Requirements at the time of this document:
    - Dual 2.8Ghz Quad Core or 6-Core CPUs (Intel or AMD)
    - 16GB System Memory
    - 250GB+ SATA or SAS RAID Array (RAID 1 with hot spare suggested)
    - Supported 10/100/1000 MB Ethernet Adapter (Intel or Broadcom® suggested)
    - Redundant Power Supply • Available USB port for Software License Key
3. VMware Platforms Supported at the time of this document
    - VMware ESXi v5.0 or newer

Note: EXSI can be download from VMWARE https://www.vmware.com

4. Virtualisation Image Provisions
    - Enterprise Class Linux OS
    - Embedded MySQL Database Server ASPECT Runtime Engine

SECTION 2 : VMWARE IMAGE DEPLOYMENT



PREPARING FOR IMAGE DEPLOYMENT

To deploy **ASPECT-Enterprise** onto a **VMware** environment, download the image from the Cylon Toolbox. The .zip file will contain images in either an OVA or OVF extension for newer releases of **VMware**. For older revision of **VMware**, an image with a VMX extension has also been provided to accommodate older versions of **VMware** that support the VMX image format.

To deploy the virtual appliance on **VMware** environments, you or an administrator must use the **vSphere®** Client Utility commonly provided with **VMware** ESX® 5.0 or higher. If you are deploying to an existing virtualization server, you must also have the appropriate permissions to access the server with the **vSphere** Client Utility. If you do not have this utility, please visit http://www.vmware.com for assistance with obtaining this utility. If you are unsure whether or not you have the appropriate permissions to access the virtualization server, please contact your network administrator for assistance.

Before installation, either copy the unzipped **VMware** image to a USB drive or have IT staff copy it over the network to the computer on which the **vSphere** Client Utility will be run. The images may be stored on any directory or drive. Alternatively, you may deploy the files directly from the USB drive itself. However, Cylon strongly recommends that you copy the files to your local PC for the most efficient deployment.

The downloaded content has the following file structure:

- **ASPECT-Enterprise** OVF Image - contains all necessary OVF and OVA files for deployments
- **ASPECT-Enterprise** VMX Image - contains all necessary VMX files for older **VMware** products

For either deployment method, please ensure that the drive you will deploy the image to has sufficient space for the image to expand as necessary.

Note: The minimum space recommended is 250GB+ SATA or SAS RAID Array (RAID 1 with hot spare suggested).

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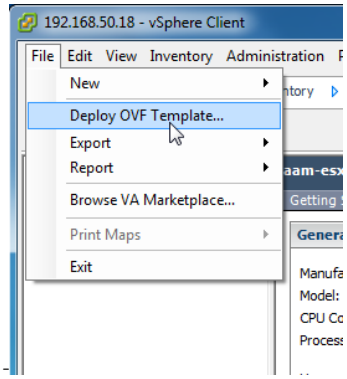
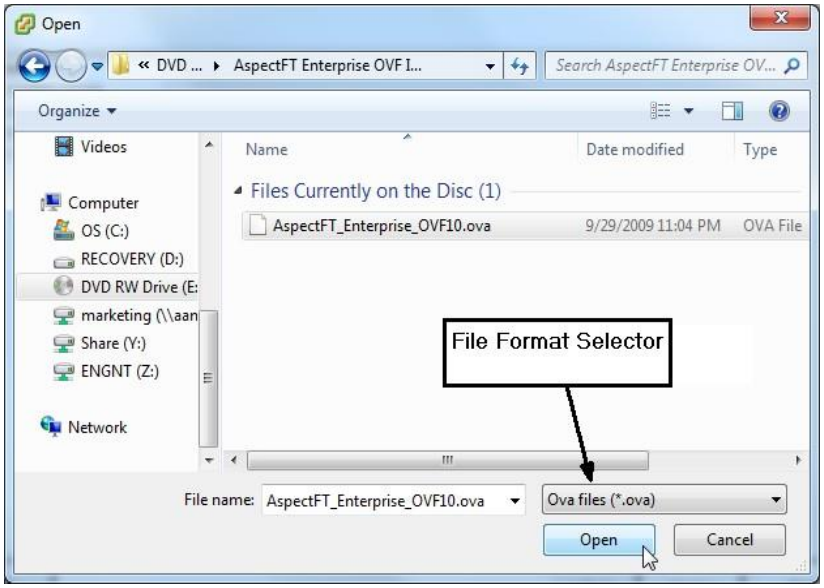
DEPLOYING ASPECT-Enterprise TO VMWARE

The following deployment process is documented around the use of **vSphere** Client v5.0.0 and **VMware** ESXi v5.0.0. or later. Depending on the revision, screen shots and dialog boxes may vary. To deploy the image, perform the following steps:

5. With **vSphere** launched and connected to your virtualization server, select `File` > `Deploy OVF Template...` from the `vSphere Client` Utility.



6. Browse your system and find the `Aspect_Enterprise_OVF10.ova` file. In order to see `OVA` extension files, you may need to change the file type from `OVF` to `OVA` using the extension chooser in the bottom right-hand corner of the browser window.



7. Follow the remaining instructions for the wizard.

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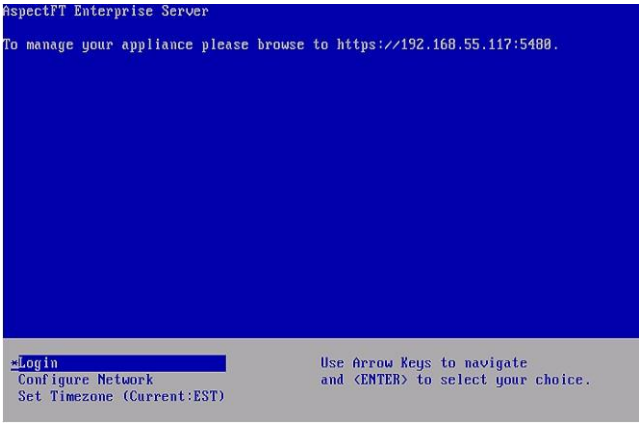
POST DEPLOYMENT

After installing and launching the virtual appliance, the virtual appliance dashboard and console can be displayed. By default, the virtual appliance will acquire an IP address using DHCP. This address is displayed on the dashboard, along with instructions to manage the application by browsing to a provided address (e.g. `http://<ip-address>:5840`).

The use of the virtual appliance dashboard is not required. Some functions present in the virtual appliance dashboard are also part of **ASPECT-Enterprise**'s built-in Web User Interface (**webUI**) and are discussed later in this document.



LICENSING

ASPECT-Enterprise requires the use of a software license file.

Note: **ASPECT-Enterprise** version 3.01.01 and higher can support a "software unique ID (UID)" instead of a hardware-based unique ID. This is primarily to support virtual machine installations where the use of a USB device to furnish Aspect's license unique ID is not permitted by the site IT staff.

OBTAINING AND INSTALLING A LICENCE FILE

Note: Ensure that the **ASPECT-Enterprise** target has been upgraded to 3.01.01 or higher. This process will silently fail on **ASPECT** 3.01.00 and lower.

Note: Ensure that the **ASPECT-Enterprise** server is at its required final IP address when carrying out this License Installation process. The active IP address is part of the calculation of the software UID and cannot be changed once the system is licensed, or the license validation will fail until a new license file is obtained.

Note: The Site ID is also used in creating the License and cannot be changed afterward. This will be displayed in the sidebar of **ngAdmin**

Make a backup copy of the current license file on the target.

Upload the supplied **ASPECT-Enterprise** Utility License to the target, replacing any license or initial stub license already installed.

The Utility License has a deliberately and universally invalid ID – it cannot be used to run **ASPECT** services. The purpose of the Utility License is to force the license subsystem to display the actual software UID

Send the backup copy of the license file and the Hardware ID reported after the Utility License is installed to the Cylon Sales department to obtain the actual license for the **ASPECT-Enterprise** Target.

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Uploading the ASPECT-Enterprise Feature License

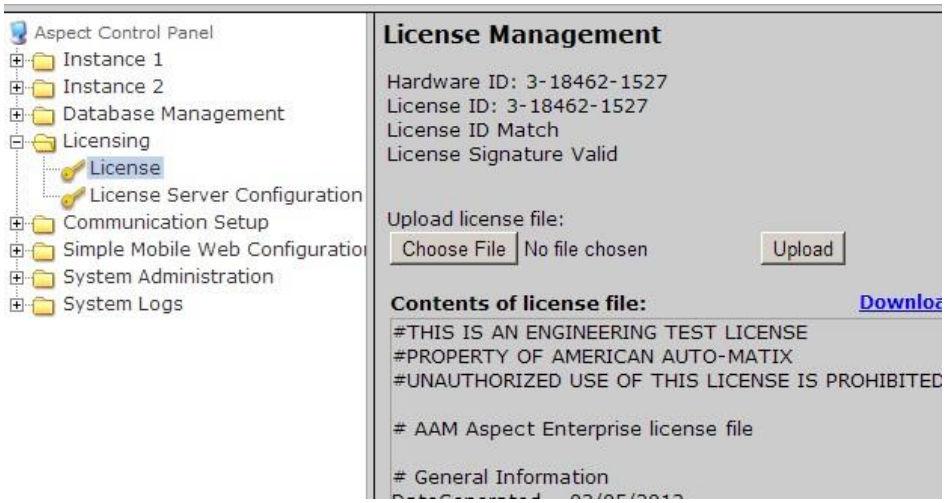
The Licence file provided by Cylon Sales is an encrypted text-based license file that can be viewed from the WebUI of **ASPECT-Enterprise** or read using any standard text editor.

Warning: Do not attempt to manually alter or adjust the text contents of the viewed from the WebUI of **ASPECT-Enterprise** license file. Attempting to do so will render the license invalid.

This file must be uploaded through **ASPECT-Enterprise**'s WebUI. To do this, log into the WebUI.

Select `Licensing` > `License` from the WebUI `tree` .

The `License Management` page displays the current license status of the **ASPECT-Enterprise** instance, as well as a method to upload/download license files.



Click `Browse` to locate the file on your PC.

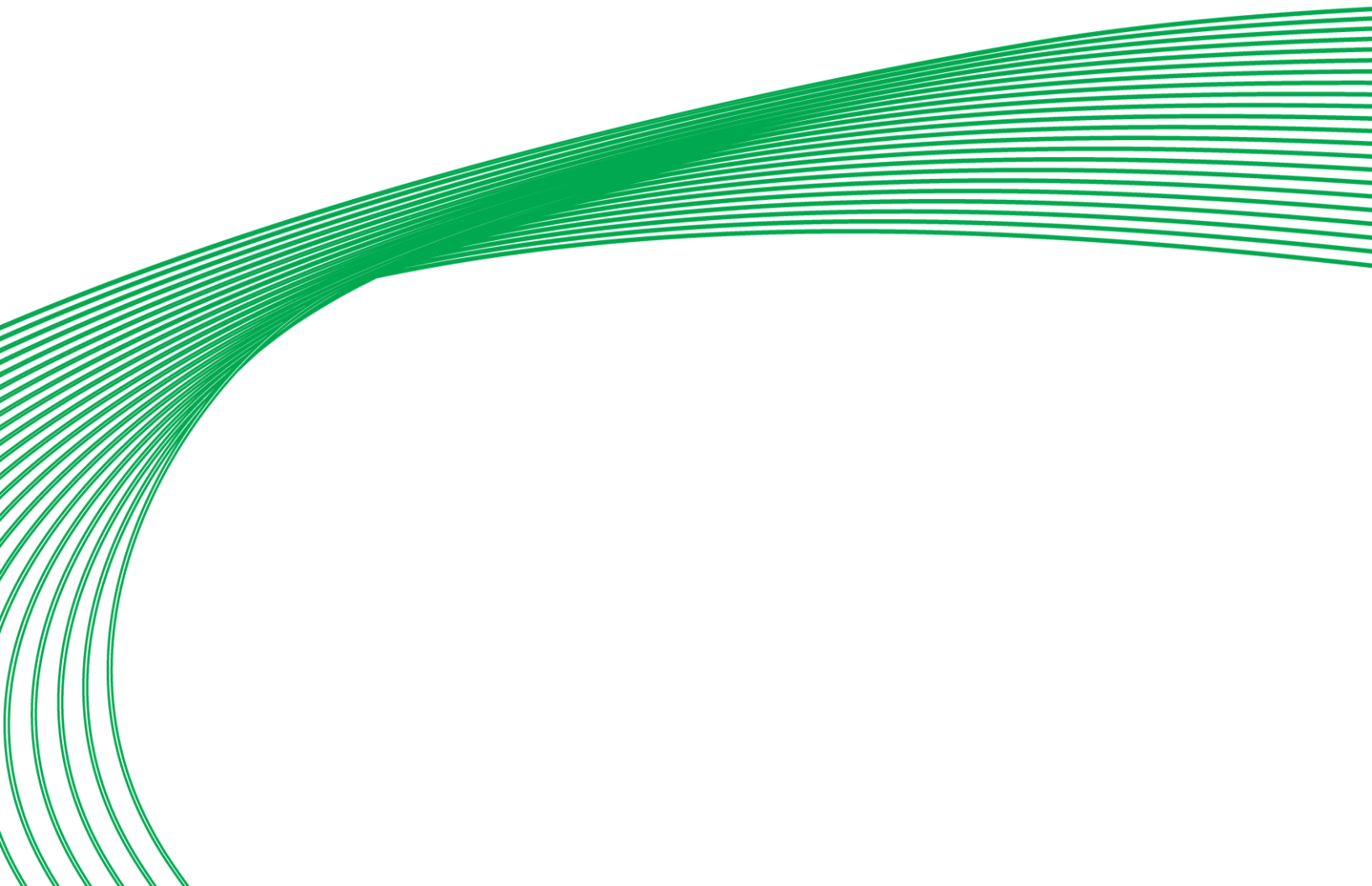
Once located, click the `Upload` button to upload the license to **ASPECT-Enterprise**.

Note: When a license file is uploaded, Cylon recommends rebooting the **ASPECT-Enterprise** server to ensure the license file is successfully applied.

APPLYING UPDATES TO ASPECT-ENTERPRISE

The downloaded content may contain patch updates to your revision of **ASPECT-Enterprise**. These updates are contained within a folder called "Aspect Updates". These updates can be applied via the **ASPECT-Enterprise** WebUI. To apply update files, please refer to the procedural document provided within this folder for additional information.

SECTION 3 : SOFTWARE CONFIGURATION



INTRODUCTION

The following provides details on the software configuration of **ASPECT-Enterprise**. Please follow the steps contained within this section for proper setup and configuration.

TOOLS REQUIRED

The following tools will be required for proper configuration of the system:

- PC/Laptop
- Ethernet cross-over cable, or other network connection to **ASPECT-Enterprise**
- Standard web-browser such as Windows **Edge**, Mozilla **Firefox**, Google **Chrome**, Apple **Safari**, or other.
- **ASPECT-Enterprise** Software License
- The license for your **ASPECT-Enterprise** Server may already be installed, provided that the End User License Agreement for the unit was signed and returned to Cylon's Inside Sales department prior to shipment.

CONNECTING TO ENTERPRISE

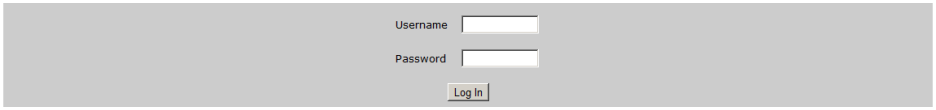
ASPECT-Enterprise is installed with a default IP address and subnet mask. Your laptop's network card must be configured in a manner where it may access this IP network setting. Refer to your operating system documentation for details on how to configure your network card.

See *Ethernet Settings* on page 26 for details on how to reconfigure **ASPECT-Enterprise** server IP Address.

LOG-IN

To log in to **ASPECT-Enterprise**:

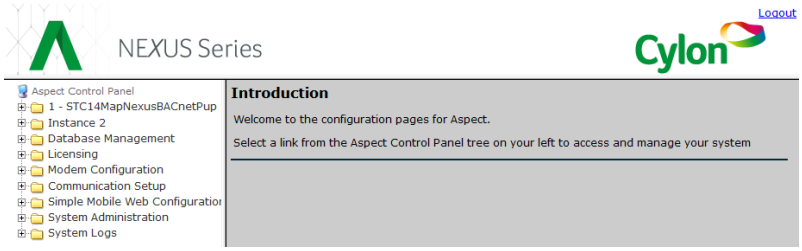
1. With your PC's network card configured, open any standard web browser.
2. Browse to the IP address of **ASPECT-Enterprise** as defined during installation.
3. If your connection is successful, the main login page of **ASPECT** will be displayed:



4. Enter the case-sensitive default username and password into the fields provided.
5. Click the Log In button.

CONTROL PANEL

When you successfully log in, you will be directed to the Control Panel. The Control Panel contains a navigation tree to the left of the web user interface; allowing users to select different configuration areas of the product.



PROJECT INSTANCE

One instance is available within the **ASPECT-Enterprise** This provides the capability to host a project within the target. Within the Instance, options exist for the following:

- Calendar Configuration
- Users and Groups
- Instance Services
- Persistence Manager
- Project Source
- Project Removal
- AspectFT Control Engine Logs
- License Item Status
- Project Performance

CALENDAR CONFIGURATION

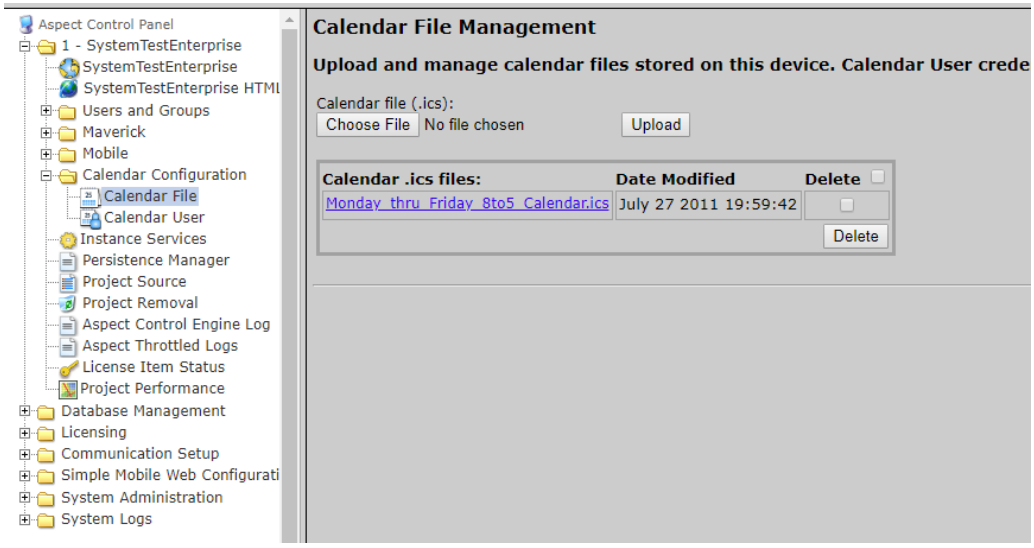
The Calendar Configuration area is used to configure **iCalendar** integration variables of the **ASPECT-Enterprise**. Within this section there are two pages:

- Calendar File
- Calendar User

CALENDAR FILE

Calendar File can be used to browse and modify what calendars have been previously published to the instance, as well as allow users to manually upload **iCalendar** files (with ICS file extensions) to the device.

- To upload a saved calendar file, simply select the Browse / Choose File button and locate the **iCalendar** file on your computer. Once located, click the Upload button.
- To delete a previously published calendar, place a checkmark next to the corresponding file and select the Delete button.



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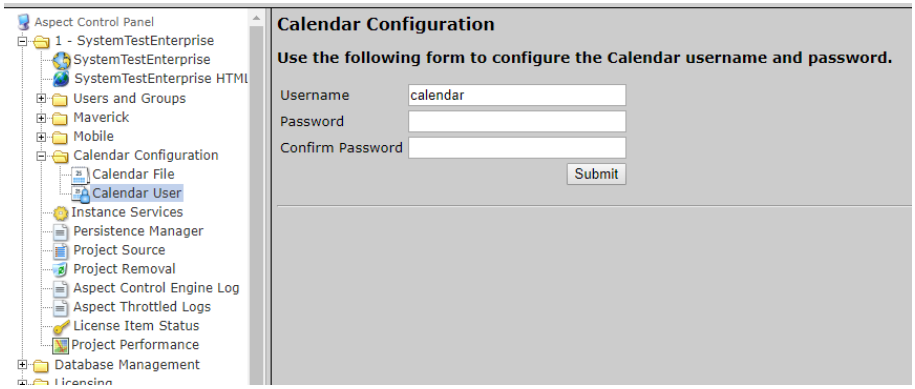
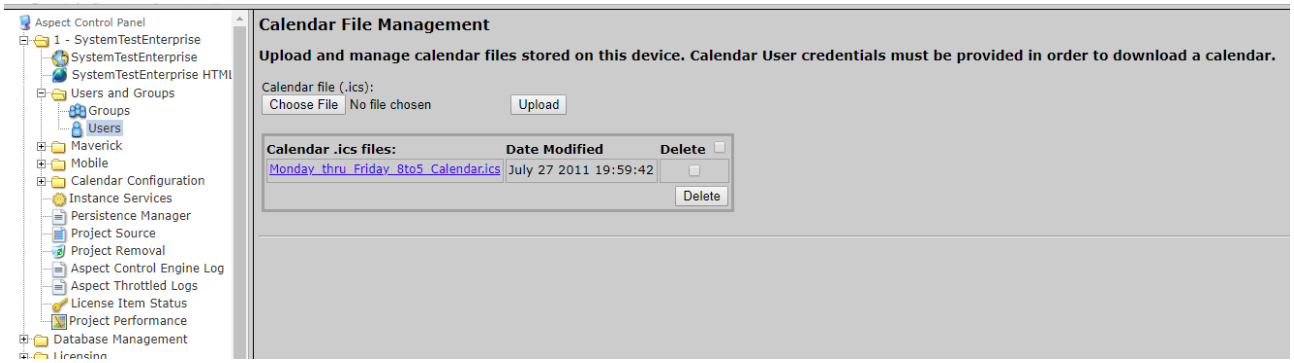
CALENDAR USER

Calendar User provides the ability to change the default username and password credentials that are required to allow **iCalendar**-based tools to publish data to the **ASPECT-Enterprise**. By default, the username (`calendar`) and password (`user`) can be changed to any desired credential set. When referencing Calendars in **ASPECT-Studio**, these credentials must be specified in order to properly access the file.



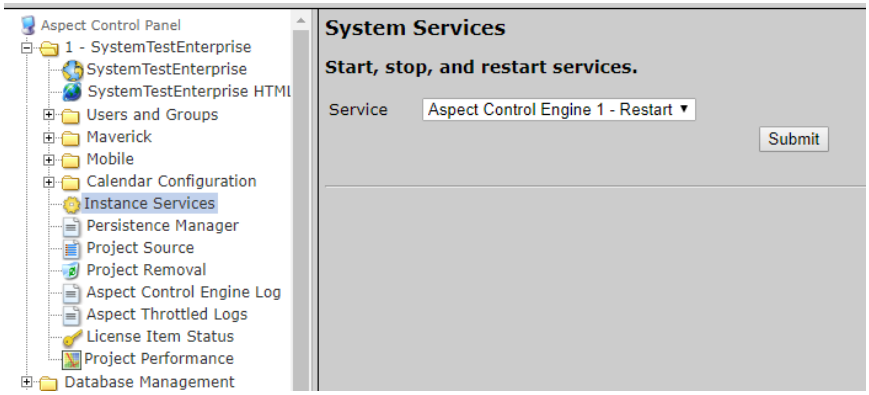
USERS AND GROUPS

Users and Groups are included within the instance in the **ASPECT-Enterprise**. This provides the ability to manage users in the **ASPECT** instance it serves.



INSTANCE SERVICES

The Instance Services provides users with the ability to restart the Aspect Control Engine for the instance. Only one option is available in the Instance Services drop-down, which will allow the instance to be reset.



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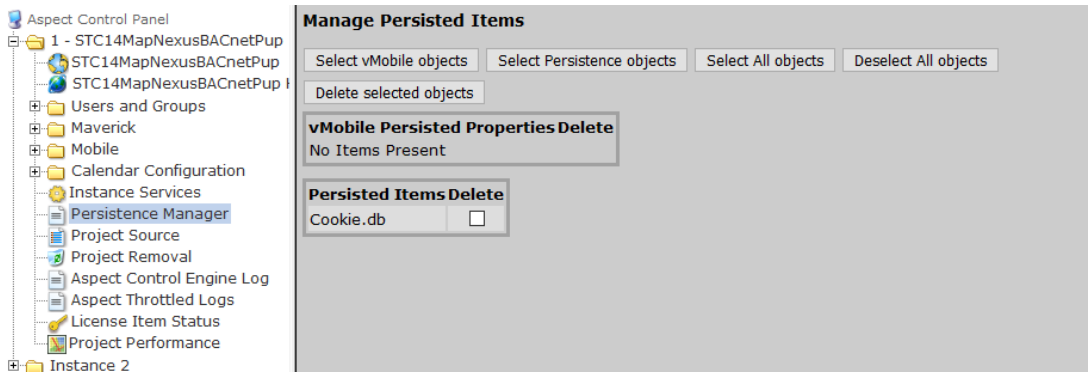
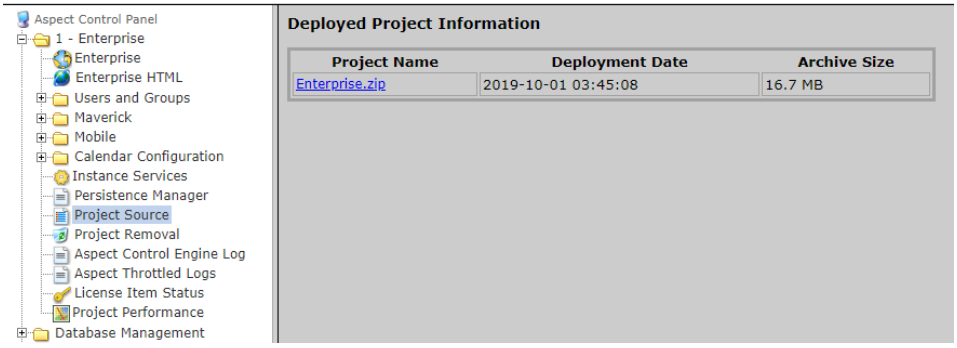
PERSISTENCE MANAGER

The Persistence Manager area is used to manage and delete **Persisted data**. **Persisted data** is localized data stored from **Persisted Elements** that may be present in an **ASPECT** project.



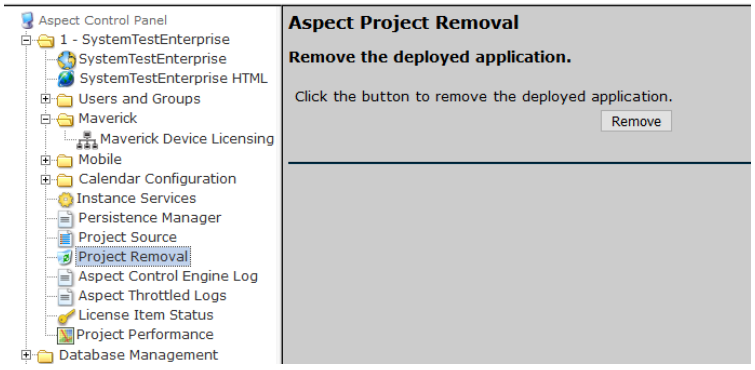
PROJECT SOURCE

The Project Source page provides administrators with the ability to download a password-protected copy of the **ASPECT** project deployed to the Instance. When selecting this in the Control Panel, you will be prompted to re-enter your credentials in order to download a copy of the project. The required credentials will be the same as the ones used to originally deploy the project.



PROJECT REMOVAL

The Project Removal page provides administrators the ability to remove a currently deployed project from an **ASPECT** instance.



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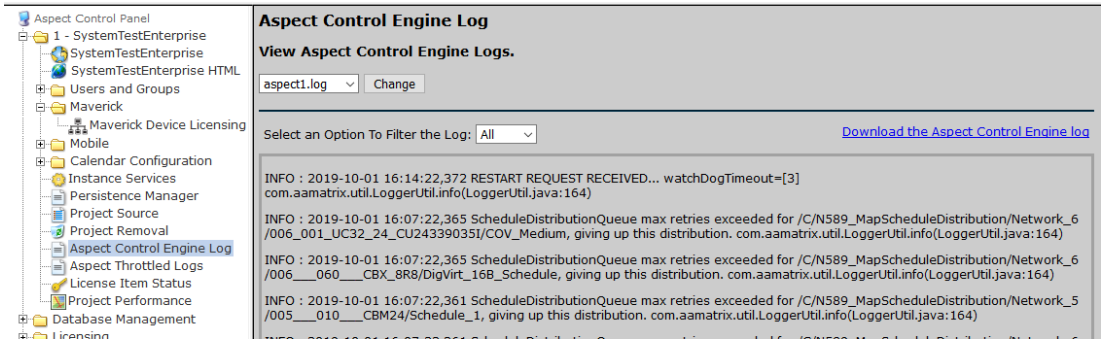
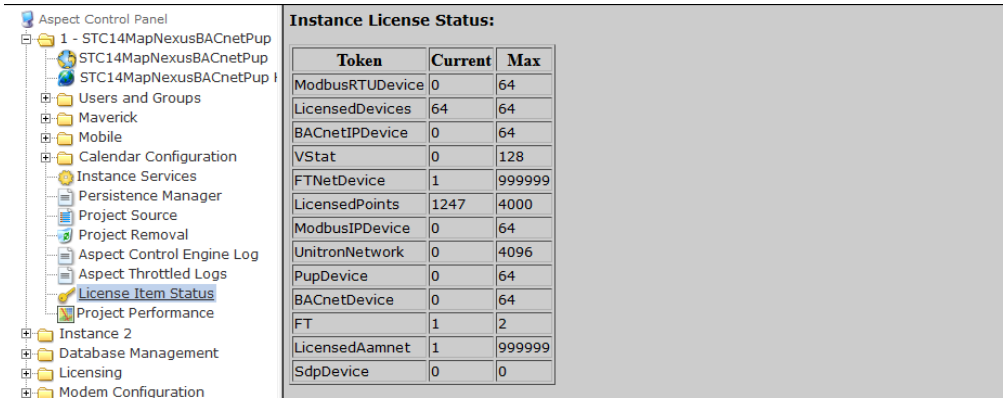
ASPECT CONTROL ENGINE LOG

The Aspect Control Engine log provides administrators and technicians with the ability to view project status and debugging information relating to the health of the deployed **ASPECT** project. Up to 10 pages of **ASPECT** logs are contained and individual logs can be downloaded.



LICENSE ITEM STATUS

The License Item Status area provides the ability to view how many current license items a project may be using, as well as the maximum number of licenses available for a particular feature or function.

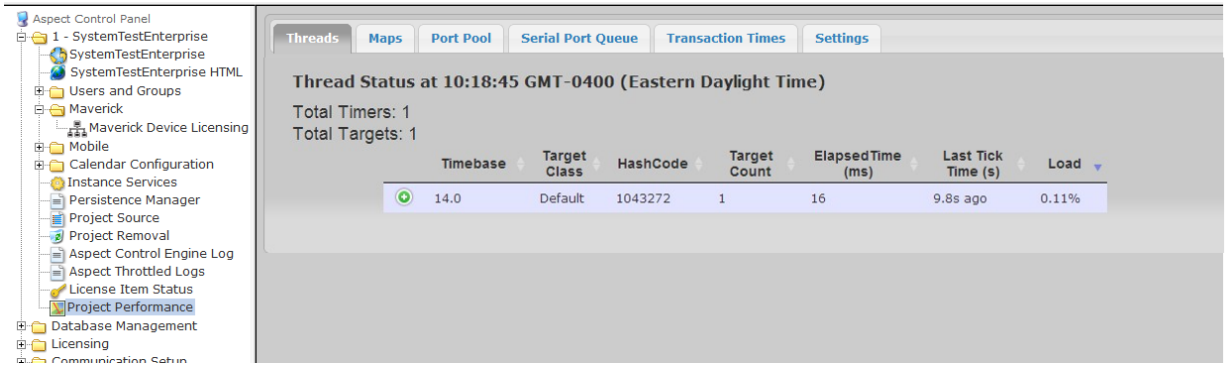


Token	Current	Max
ModbusRTUDevice	0	64
LicensedDevices	64	64
BACnetIPDevice	0	64
VStat	0	128
FTNetDevice	1	999999
LicensedPoints	1247	4000
ModbusIPDevice	0	64
UnitronNetwork	0	4096
PupDevice	0	64
BACnetDevice	0	64
FT	1	2
LicensedAamnet	1	999999
SdpDevice	0	0

PROJECT PERFORMANCE

The Project Performance area provides the ability to dynamically view and monitor the status of Threads, Maps, Serial Port Queue, Transaction Times and Ports being used by the **ASPECT** project loaded into the target.

By default, all Tabs will update information every 15 seconds. You may adjust this update timer by choosing the Settings tab and changing the Update Interval Parameters.



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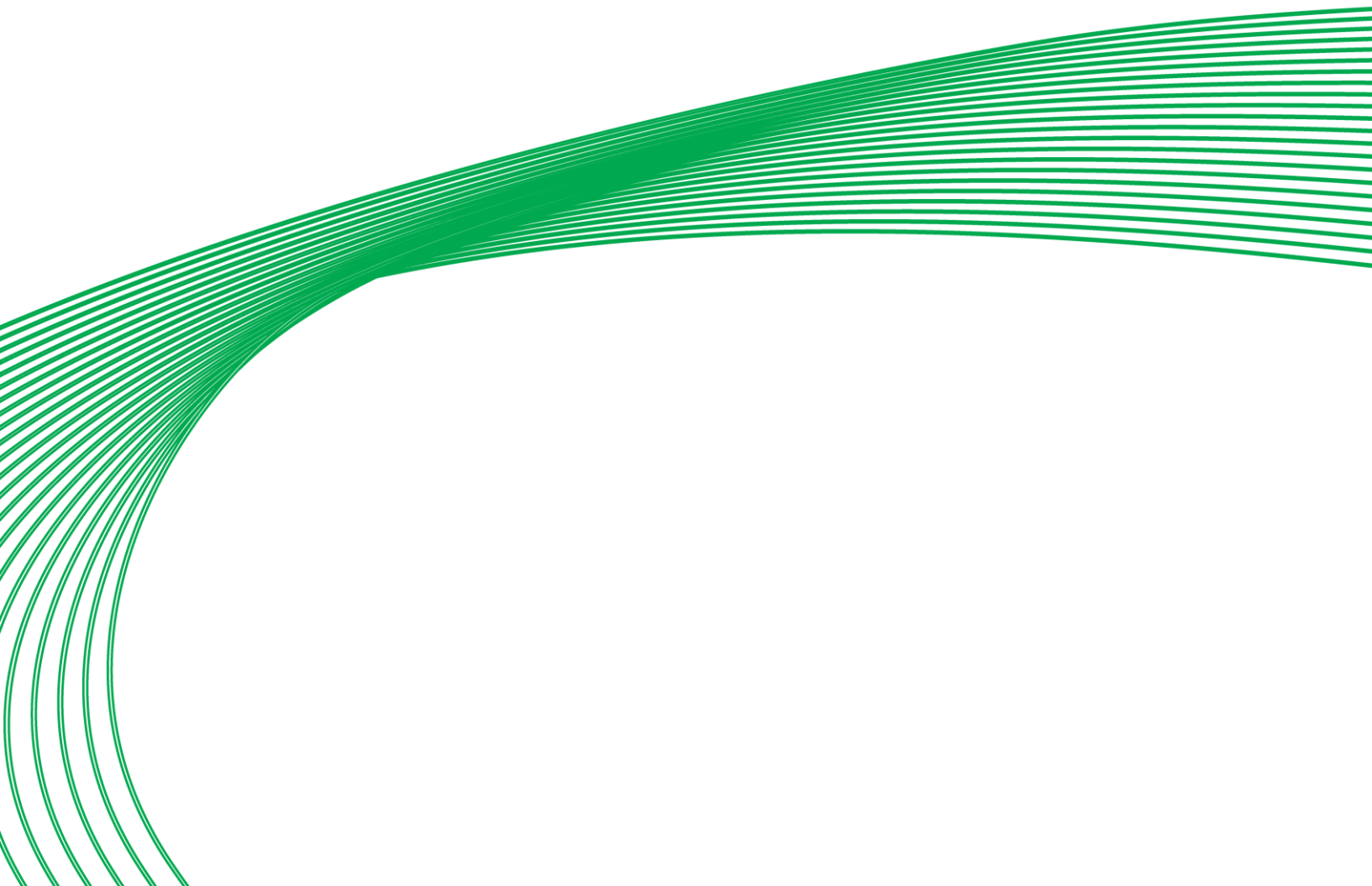
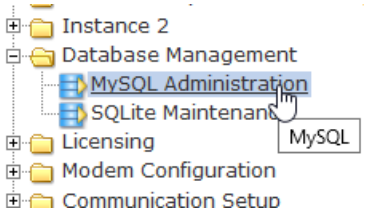
SECTION 4 : DATABASE MANAGEMENT



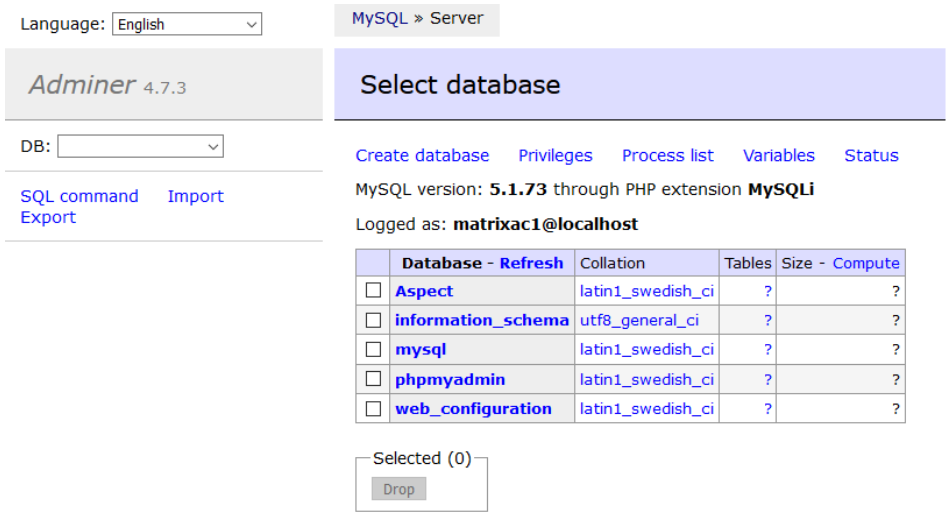
Database Management is the centralized location for all database storage and contains paths to **MySQL** administration and **SQLite** maintenance.

MYSQL ADMINISTRATION

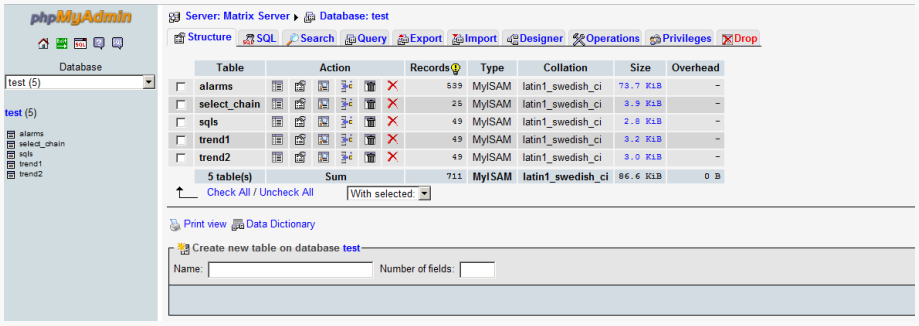


The MySQL Administration item in the webUI tree links to an administration interface for **ASPECT**'s **MySQL** Database Server. To access the Database Interface, the user must enter (case sensitive) login credentials. The default credentials are:

- Username - ***matrixac1***
- Password - ***aam***

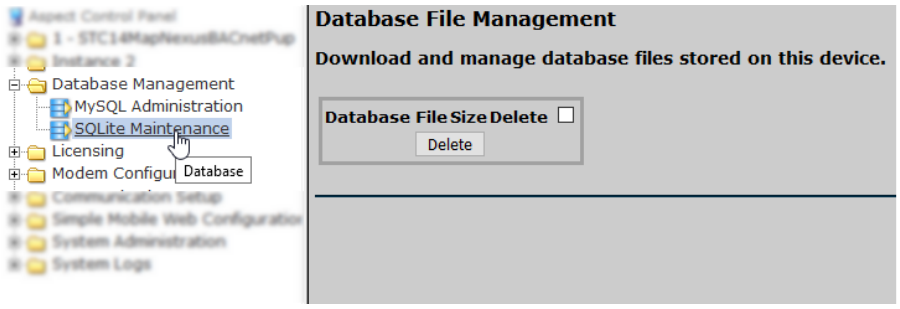


Note: **MySQL** administration in **ASPECT** `3.03.02` and later uses **Adminer**. However, on devices running `3.03.01` or earlier the UI for **MySQL** administration is based on **phpMyAdmin**:



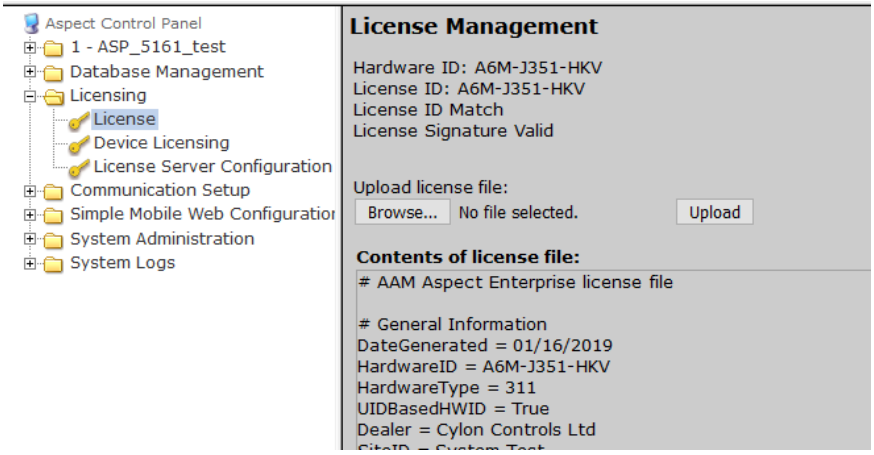
SQLITE MAINTENANCE

The SQLite Maintenance page provides users with the ability to manage the **SQLite** database. This page shows the database files and sizes.



Licensing

The License page provides the ability to view the current license status of the **ASPECT-Enterprise** server as well as a method to upload/download license files. If a license file is uploaded, Cylon Controls recommends rebooting the **ASPECT-Enterprise** server to ensure the license file is successfully applied.



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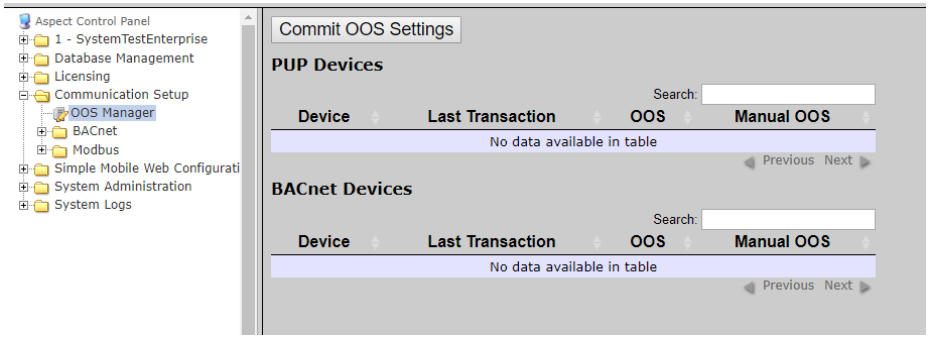
COMMUNICATION SETUP

The Communication Setup page provides administrators the ability to configure, BACnet IP Router, BBMD, Time Synchronization settings, and the Out of Service Manager Manager.

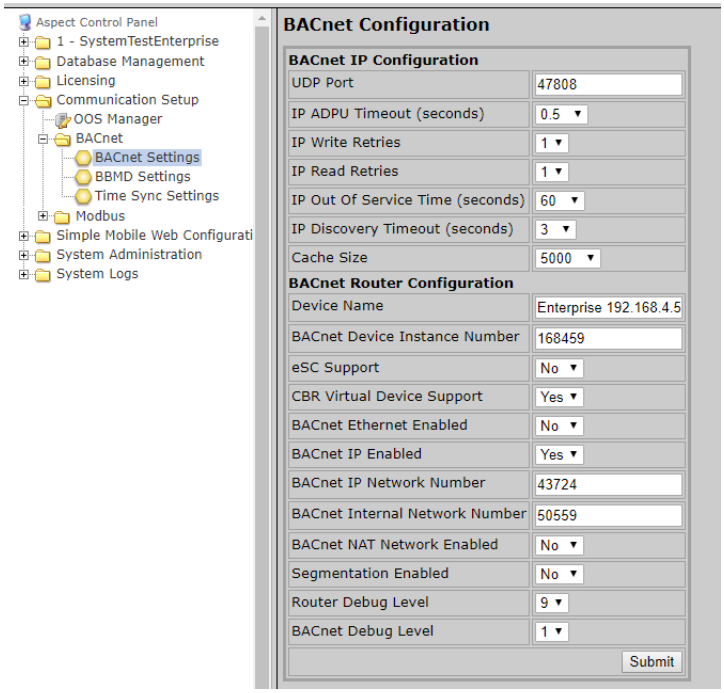
OUT OF SERVICE MANAGER (OSS)

The Out Of Service Manager (OSS) provides a single location that allows administrators to manually mark devices out of service using the Manual OOS check boxes.



BACNET SETTINGS

The BACnet Configuration area allows configuration of read/write retries, port configuration, and router settings for BACnet/IP.



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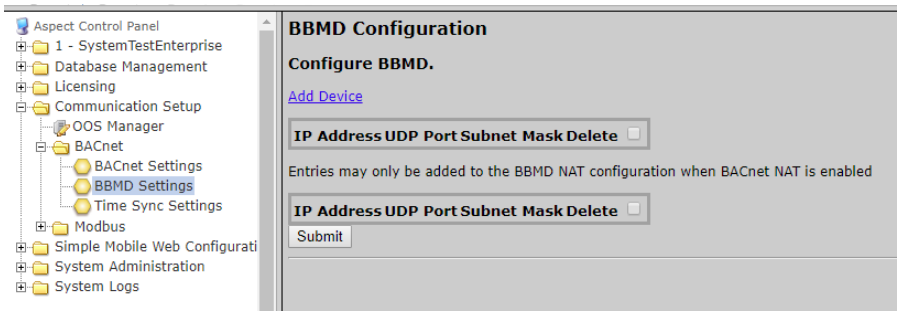
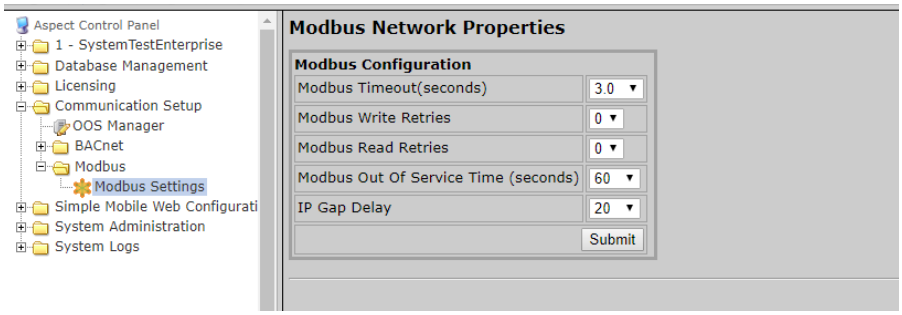
BBMD SETTINGS

The BBMD settings area is used to configure the BACnet/IP Broadcast Management Device (BBMD) table setup for BACnet networks.



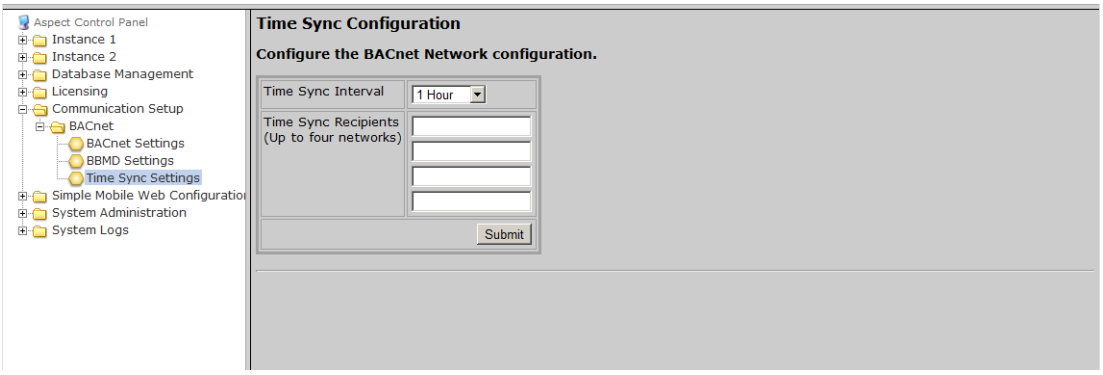
MODBUS NETWORK PROPERTIES

The Modbus Network Properties page is used to set the configuration for Modbus communications.



TIME SYNC SETTINGS

The Time Sync Settings area provides the ability to configure BACnet network time synchronizations.



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SYSTEM ADMINISTRATION

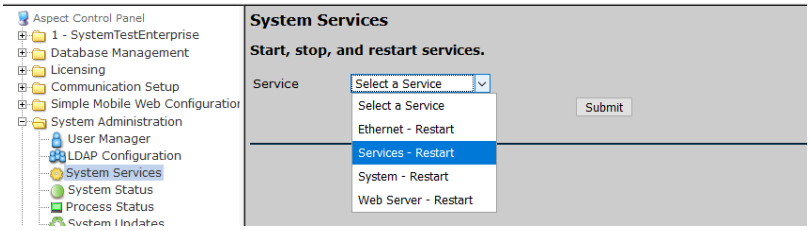
The System Administration area contains system settings for the **ASPECT-Enterprise**. These fields include the User Manager, System Services, System Status, System Updates, Ethernet Settings, Time Settings, Web Server Configuration, Process Status, and Image Proxy Configuration.

USER MANAGER

The User Manager area provides fields to setup, add and remove administrative users from the **ASPECT-Enterprise**. Administrative users are granted full access to the Aspect Control Panel while users/groups created within an instance are only allowed access to deployed projects.

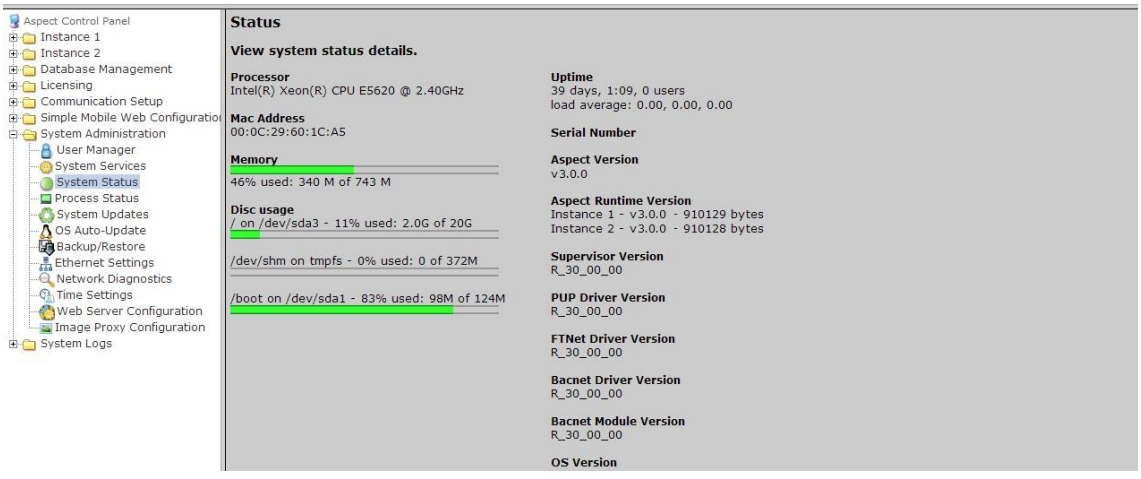
SYSTEM SERVICES

The System Services area provides administrators with the ability to control key services relative to the target. Through this area, users can restart specific services of the **ASPECT-Enterprise**. Simply select an option from the drop-down and click Submit. A message will indicate that the service has been stopped/started/restarted successfully.



SYSTEM STATUS

The System Status page provides details on the current health of the system including uptime, memory (RAM) utilization, disk space and all information pertaining to revision levels.



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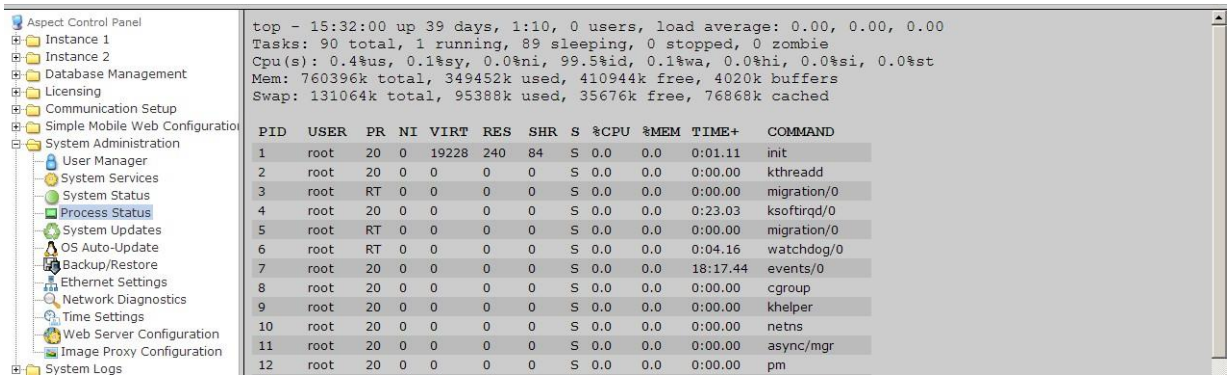
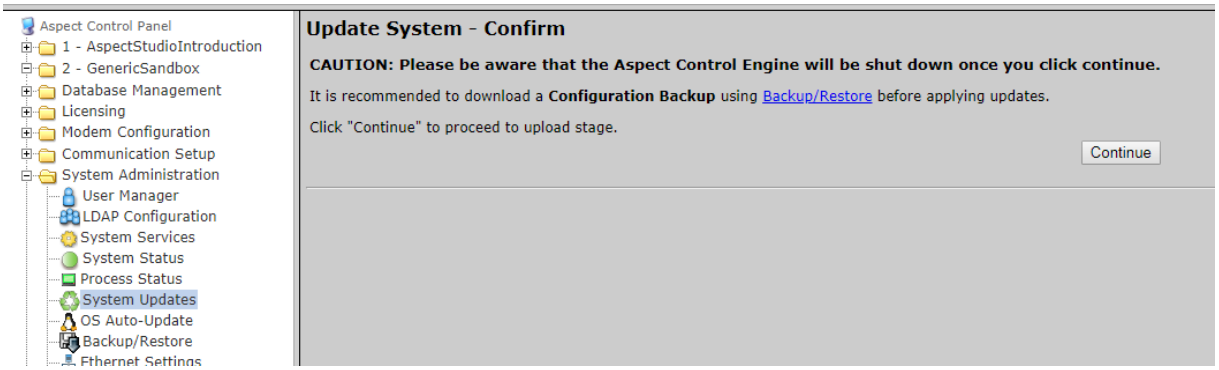
PROCESS STATUS

This shows the result of a top command which produces an updating list of current processes running.

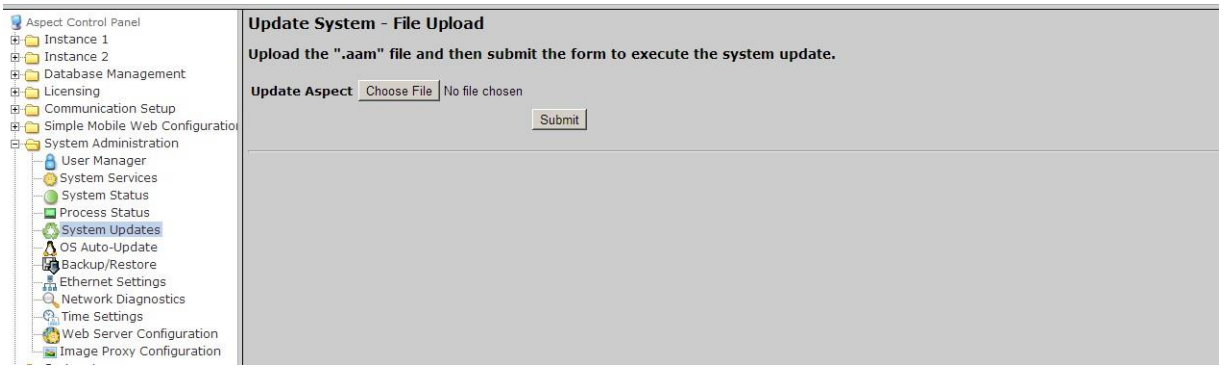


SYSTEM UPDATES

The System Updates area is used to perform firmware upgrades to the **ASPECT** device. These firmware updates can be obtained from Error! Unknown document property name..



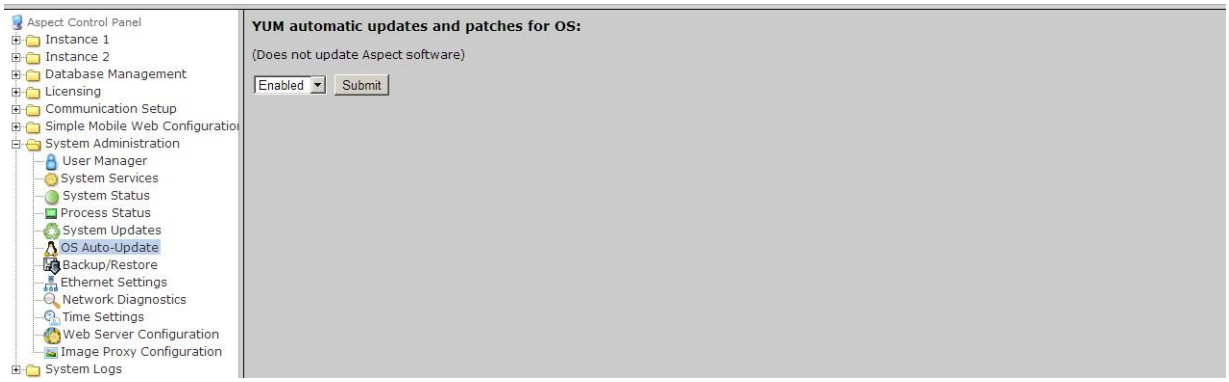
Clicking on the Continue button opens the upload page:



OS AUTO-UPDATE

For troubleshooting purposes, the OS Auto-Update page is available.

This setting should remain at its default setting of `Enabled`, unless instructed by Cylon Technical Services to disable.



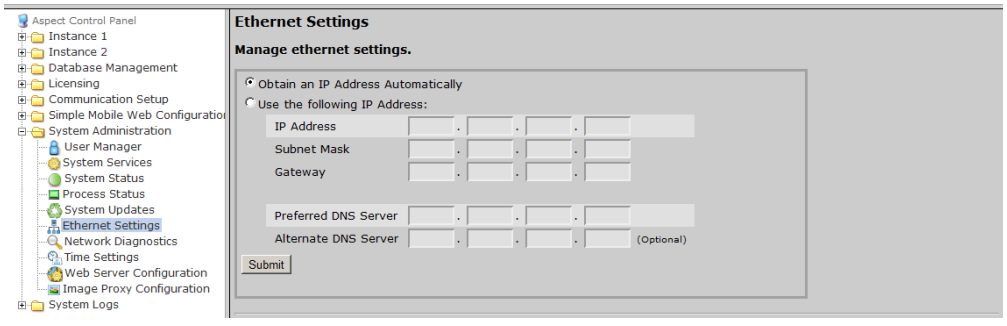
BACKUP/RESTORE

Backup /Restore provides the means to backup an **ASPECT** target's device configuration (network addresses, port and driver configuration, etc). To create a backup, simply click the Download button.

ETHERNET SETTINGS

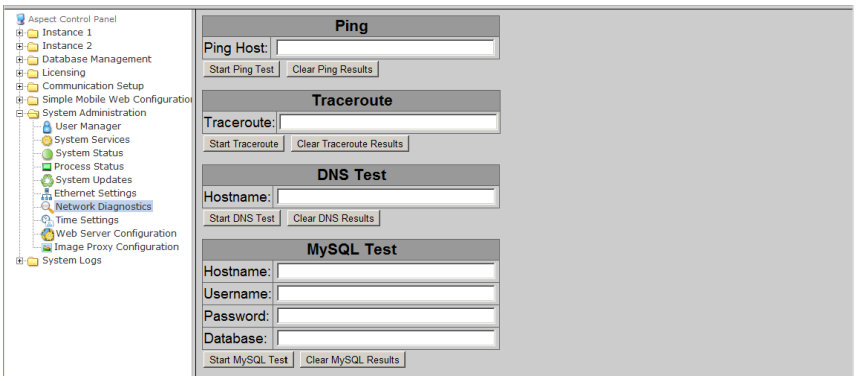
The Ethernet Settings area permits for Ethernet address configuration of the **ASPECT-Enterprise**. The **ASPECT-Enterprise** can support static IP addresses or DHCP addressing from a valid DHCP server. Simply select the appropriate address setting for your application.

- To configure the device to use DHCP addressing, select the Obtain an IP Address Automatically radio button. In most DHCP environments, a resolvable DNS name or reserved IP address is assigned to the **ASPECT-Enterprise** by the local network administrator prior to configuring the device for this option.
- To configure the device to use a static IP address, select the Use the following IP Address radio button, then enter your IP address , Subnet Mask , Gateway , and DNS information into the boxes provided below.



NETWORK DIAGNOSTICS

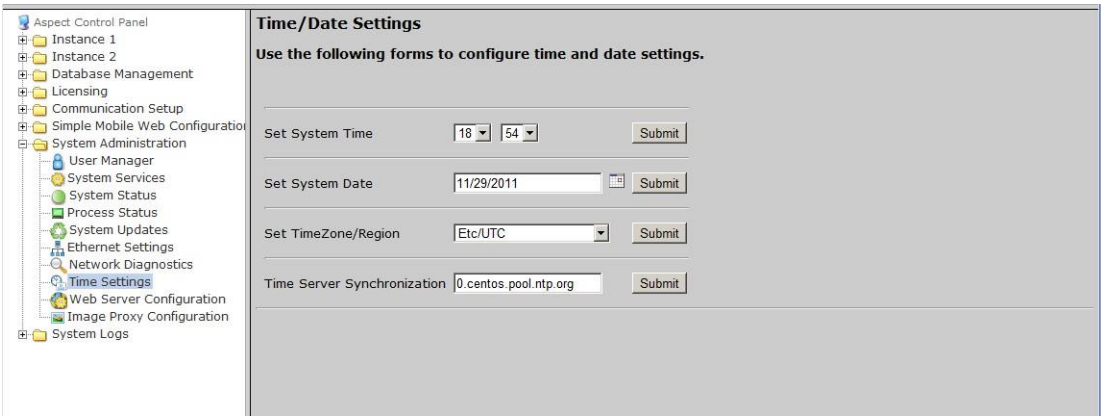
The Network Diagnostics area contains useful troubleshooting methods for network connectivity problems without the need for additional tools.



TIME SETTINGS

The Time/Date Settings area allows users to configure the **ASPECT-Enterprise** Time and Date parameters. In this section, users can set the following items using the appropriate drop-downs and editors:

- System Time - specified in military time
- System Date - specified in MM/DD/YYYY
- TimeZone/Region - specified in one of many configurable options
- Time Server Synchronization - Specifies an NTP time server on the Internet with which to sync the system time. Refer to pool.ntp.org for information relative to other available NTP servers available.



Enterprise Host/VM NTP (Time Sync) Configuration

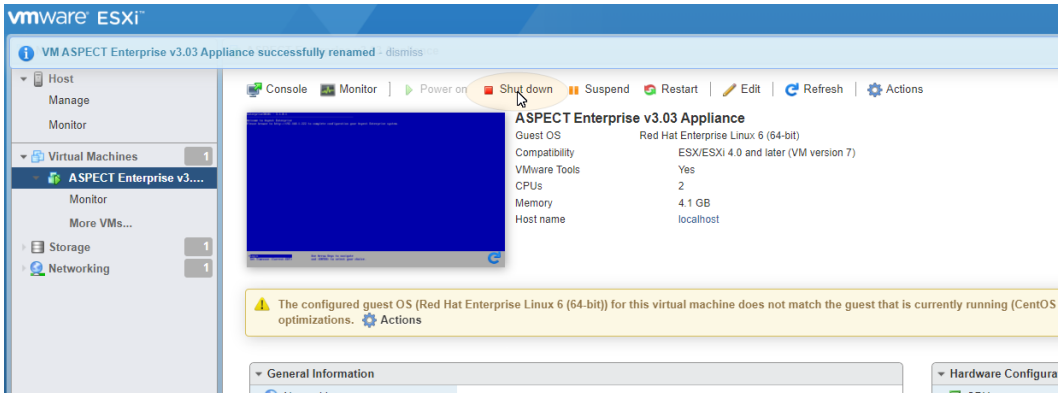
Some installations of **ASPECT-Enterprise** experience time drift if the **VMWare ESXi** host is configured with NTP (Network Time Protocol) enabled. This section outlines the procedure for disabling NTP on the **ESXi** host and enabling it on **ASPECT-Enterprise** Virtual Machine.

Note: The following sections use an IP address of `192.168.4.59` for the VM as an example. Replace this with the actual IP address of your VM,

- **To Disable Time Sync from the VM to the ESXi Host**

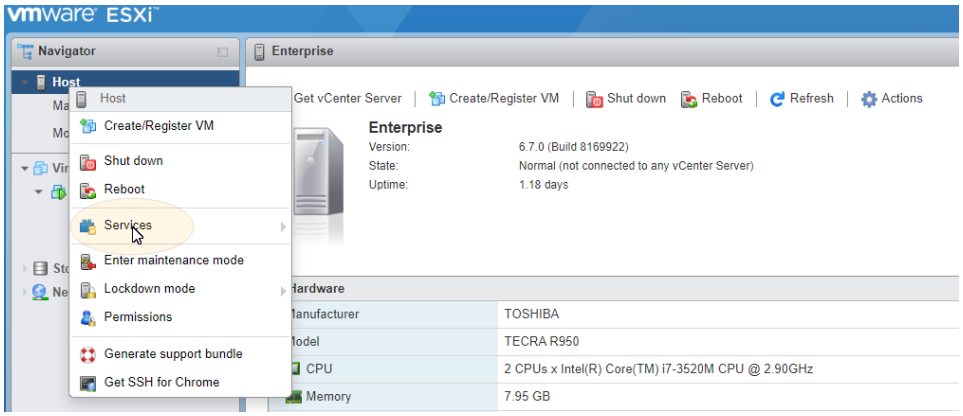
From **VMWare ESXi** web interface - shutdown the Virtual Machine

Open `https://192.168.4.61/ui/#/login` in a web browser and login with the root credentials created during installation.



Enable SSH on the **VMWare ESXi** host machine:

right-click Host , select services and select Enable Secure Shell (SSH)



With any SSH client (e.g. **Bitvise** or **PuTTY**) log in to the **VMWare ESXi** Host as root credentials created during installation.

```
ssh 192.168.4.61
```

- *Find the .vmx file*

```
find / -name "*.vmx"
```

The output should be something like

`/vmfs/volumes/5a1ee46e-a7a3a9e8-62d6-6c626d4d4c8f/Enterprise/Enterprise.vmx`

- *Edit the `.vmx` file using vi*

```
vi /vmfs/volumes/5a1ee46e-a7a3a9e8-62d6-6c626d4d4c8f/Enterprise/Enterprise.vmx
```

- *change the following:*

```
tools.syncTime                  =  "FALSE"
time.synchronize.continue       =  "FALSE"
time.synchronize.restore        =  "FALSE"
time.synchronize.resume.disk    =  "FALSE"
time.synchronize.shrink         =  "FALSE"
time.synchronize.tools.startup  =  "FALSE"
```

  save the file (press [esc] then enter `:wq!`)

- *Find the VMid of the Enterprise server*

  Logged in as root:

```
vim-cmd vmsvc/getallvms
```

  Output:

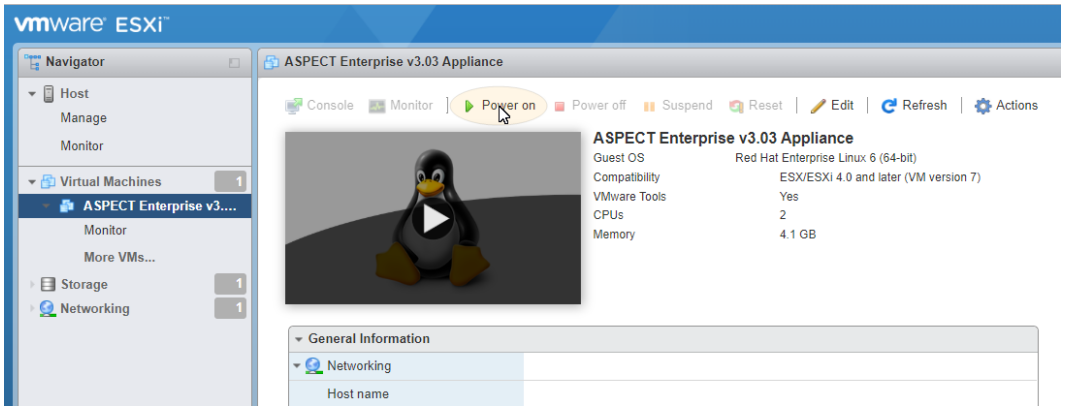
```
Vmid Name File Guest OS Version Annotation

1 Enterprise [Datastore1] Enterprise/Enterprise.vmx centos64Guest vmx-07 With the Aspect control engine you are not limited to just one solution. Aspect is based upon open-standards used within multiple industries. Designed to perform control sequences and building management routines from an array of device platforms, Aspect can communicate utilizing drivers such as BACnet®, MODbus®, and PUP. Through varying aspects of the software, users can scale their projects based on the size as well as hardware, and still receive the level of sophistication and control they expect.
```

  This shows the Vmid to be `1`.

- *Reload the .vmx file*

```
vim-cmd vmsvc/reload 1
```

- *Restart the VM*



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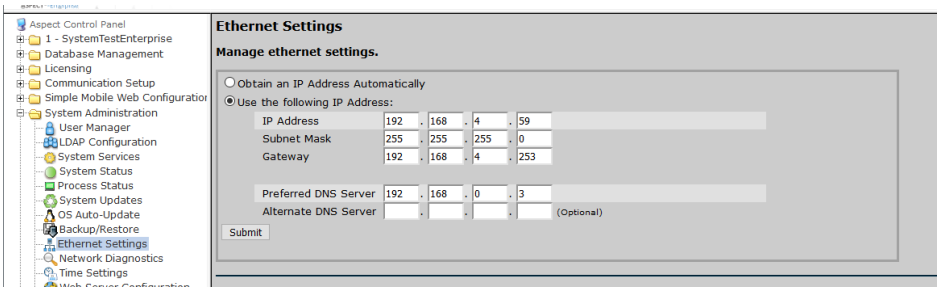
- *Verify that the DNS server configuration is correct in the ASPECT WebUI*

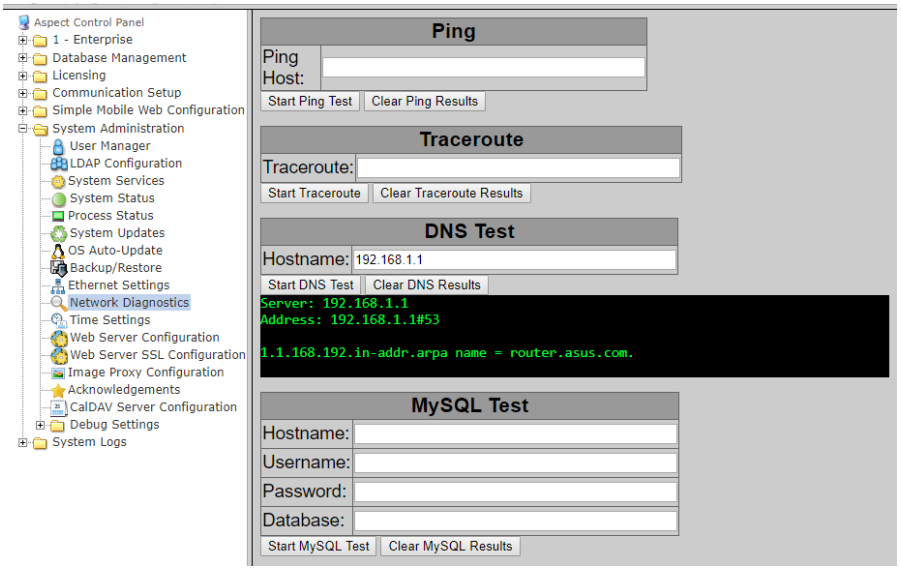
Current DNS server is shown in the Ethernet Settings:



Verify the DNS server name from the system administrator or run `ipconfig /all` from a windows server on the network.

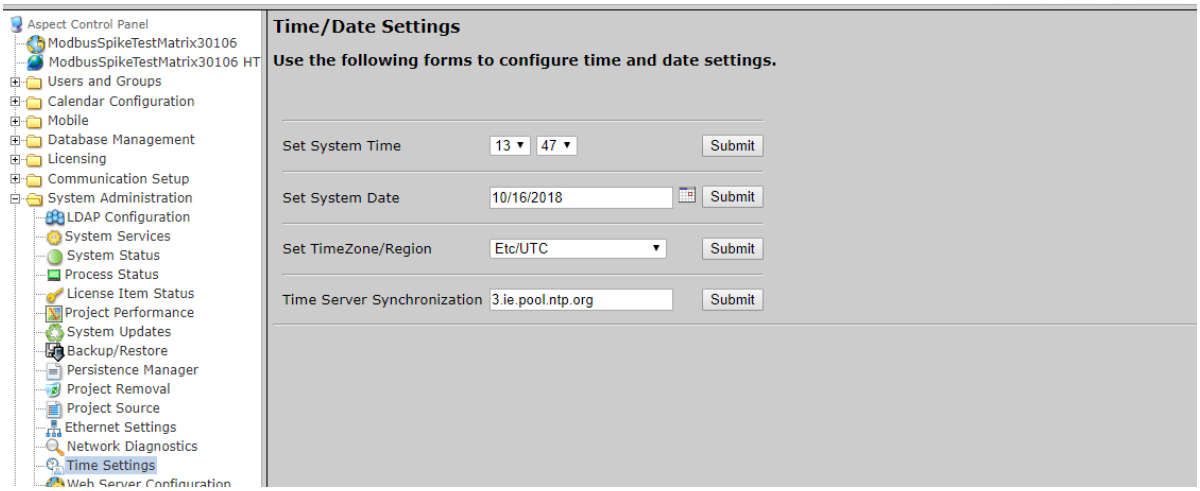
```
Connection-specific DNS Suffix  . :
Description . . . . . . . . . . . : Intel(R) Wireless-AC 9560
Physical Address. . . . . . . . . : 48-F1-7F-52-94-AA
DHCP Enabled. . . . . . . . . . . : Yes
Autoconfiguration Enabled . . . . : Yes
IPv6 Address. . . . . . . . . . . : 2606:a000:1215:c6bc:29c6:606c:2e30:2206(Preferred)
Temporary IPv6 Address. . . . . . : 2606:a000:1215:c6bc:95a8:fc84:e94b:5c86(Preferred)
Link-local IPv6 Address . . . . . : fe80::29c6:606c:2e30:2206%6(Preferred)
IPv4 Address. . . . . . . . . . . : 192.168.1.74(Preferred)
Subnet Mask . . . . . . . . . . . : 255.255.255.0
Lease Obtained. . . . . . . . . . : Wednesday, October 2, 2019 1:09:04 PM
Lease Expires . . . . . . . . . . : Thursday, October 3, 2019 1:09:05 PM
Default Gateway . . . . . . . . . : fe80::4eed:fbff:feae:6978%6
                                    192.168.1.1
DHCP Server . . . . . . . . . . . : 192.168.1.1
DHCPv6 IAID . . . . . . . . . . . : 55112063
DHCPv6 Client DUID. . . . . . . . : 00-01-00-01-23-F2-02-CD-B0-0C-D1-9C-5E-A7
DNS Servers . . . . . . . . . . . : 2606:a000:1215:c6bc::1
                                    192.168.1.1
NetBIOS over Tcpip. . . . . . . . : Enabled
```

Verify that the DNS server **IP address** is correct as follows:



Note: Select Network Diagnostics from the **ASPECT-Enterprise** Control Panel tree, enter the DNS IP address from the Ethernet configuration screen and click on Start DNS Test. If the screen shows as specified above, the IP address is valid and you have a connection to good DNS Server. If the IP address is not a valid DNS Server, the black screen will be blank.

- *Setup Time sync server on the VM in the ASPECT WebUI*



The NTP time server is toggled off by removing the time server name in the Time Server Synchronization field and clicking submit. And it is toggled back on by setting server name with a valid NTP host name or IP address.

The process for configuring NTP on an Aspect target is as follows:

1. Toggle the NTP service off
2. Set the system date to the current date and click submit
3. Set the system Time zone to your timezone and click submit
4. Set the system time to the current time and click submit
5. Toggle the NTP service on - enter a valid NTP server IP address or hostname and click submit

Failure to configure NTP and related parameters in this sequence could cause NTP to panic and subsequently shutdown effectively decommissioning the NTP service completely

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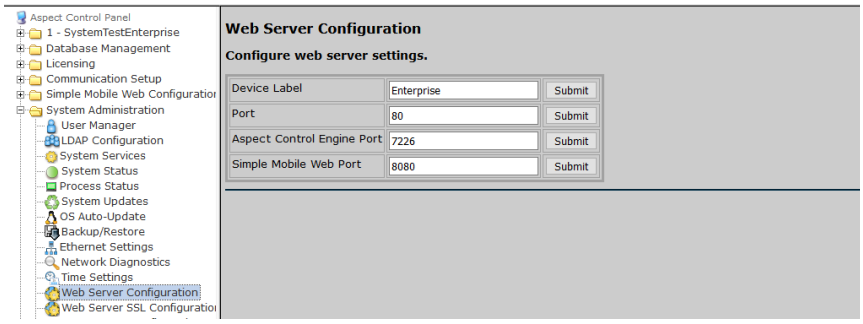
WEB SERVER CONFIGURATION

The Web Server Configuration area is used to set a label for the login screen and to change port settings for the following:

- Aspect Control Panel - defaults to port 80 (HTTP)
- Aspect Control Engine - defaults to port 7226

Note: Make sure that each port change is saved, to avoid 2 services responding to the same port. This may cause connection access to that service to be lost.



WEB SERVER SSL CONFIGURATION

The SSL Certificate Management page allows SSL certificates to be generated or uploaded.

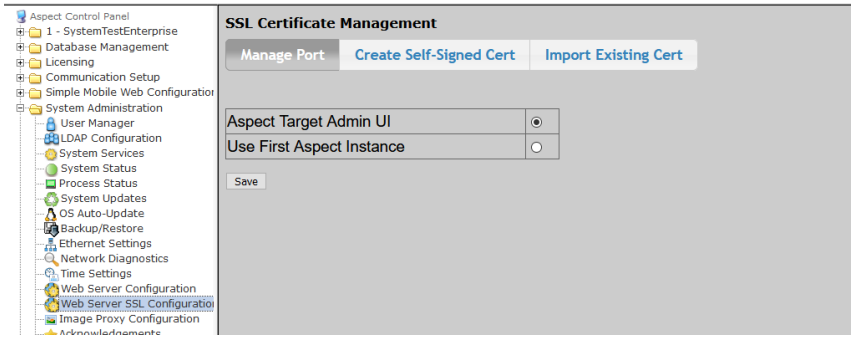


IMAGE PROXY CONFIGURATION

The Image Proxy Configuration page permits users to enable or disable image proxy, allowing **ASPECT** to access external sites to retrieve graphics.

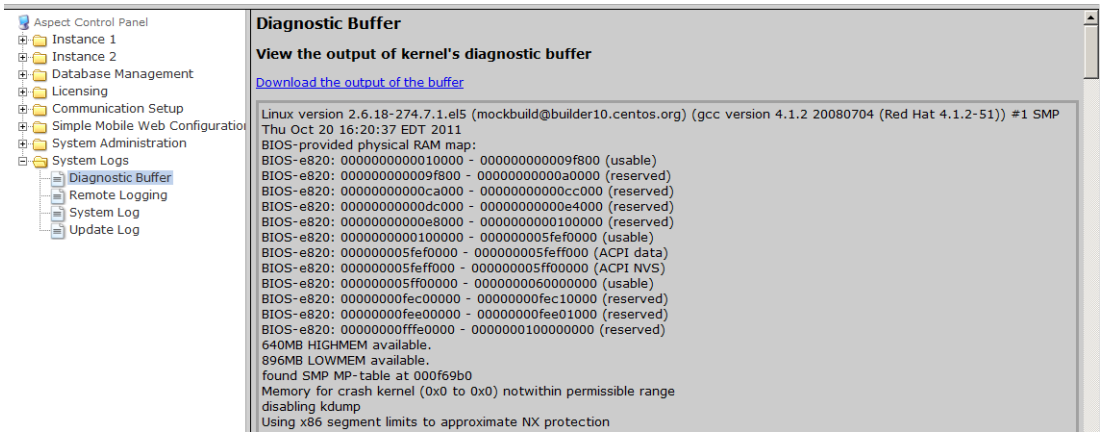
SYSTEM LOGS

The System Logs area provides users with the ability to view and download messages generated by the **ASPECT-Enterprise** and the Aspect control engine. The System Logs area provides three logs:

- System Log - contains information processed by the sub-level operating system outside of Aspect
- Diagnostic Buffer - provides kernel operating system output for the device. The information shown here is for diagnostic purposes and may be referenced during troubleshooting sessions with Cylon Technical Services. No configurable properties or values are present in this area.
- Remote Logging - The Remote Logging page is used to allow or disallow centralized syslog messaging. All Aspect targets support the ability to send their log information to a centralized Aspect target or IT-supported syslogserver.
- Update Log- shows any recent YUM updates in the system.

DIAGNOSTIC BUFFER

The Diagnostic Buffer provides diagnostic information regarding the **ASPECT-Enterprise** hardware and OS details.



REMOTE LOGGING

The Remote Logging page is used to allow or disallow centralized syslog messaging. All **ASPECT** targets support the ability to send their log information to a centralized **ASPECT** target or IT-supported syslog server.

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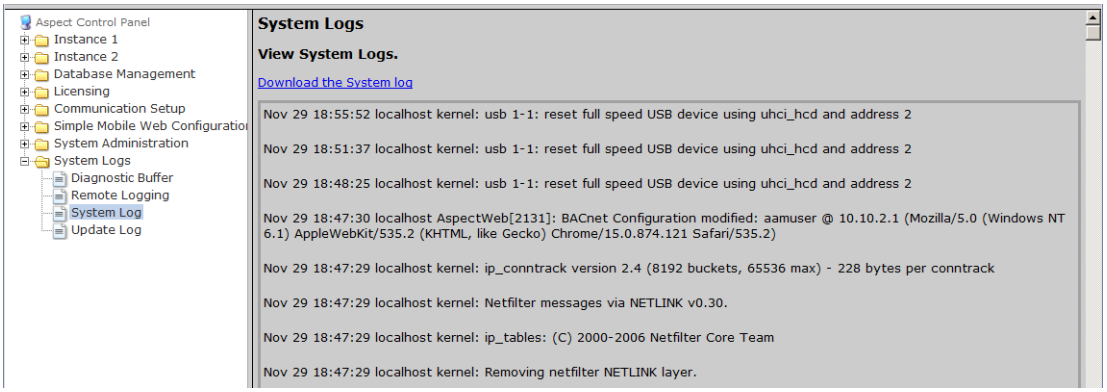
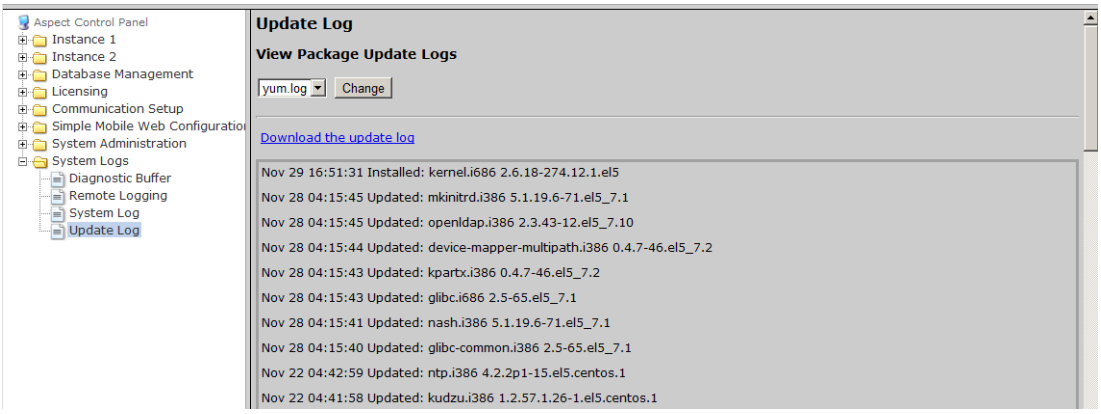
SYSTEM LOG

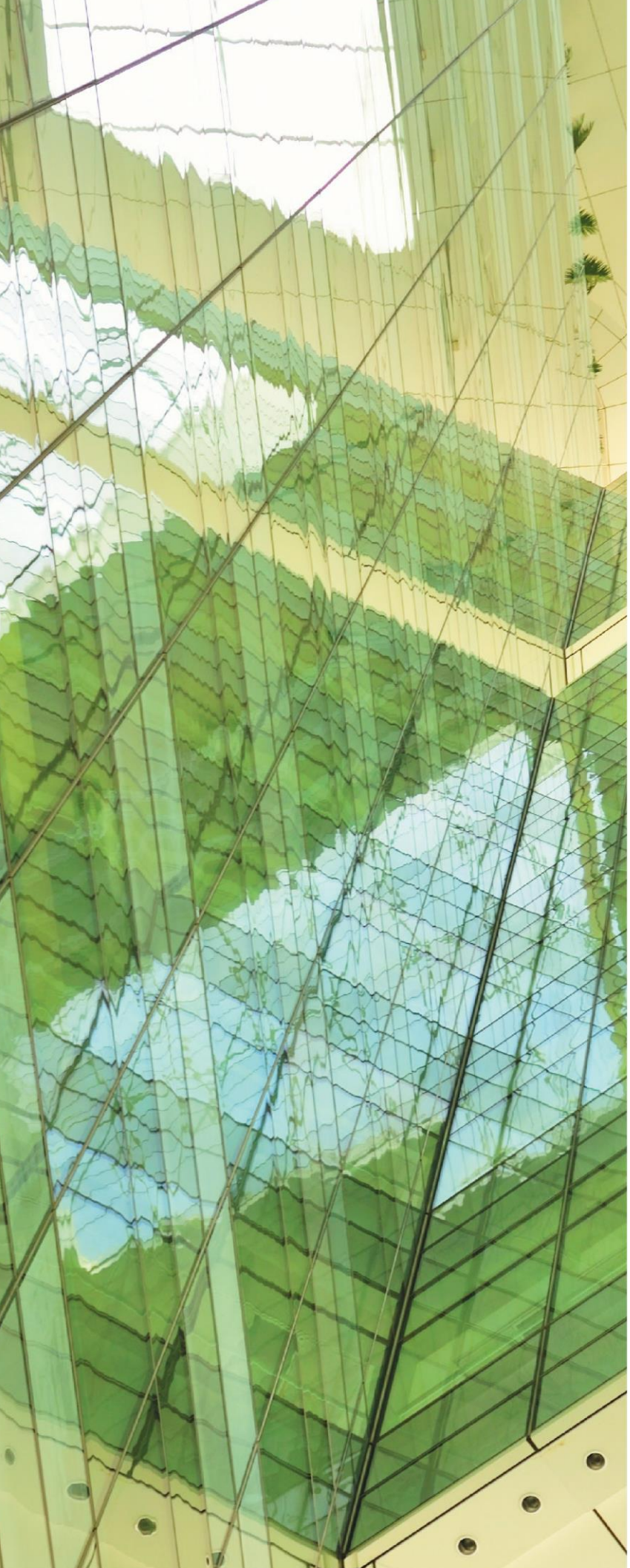
The System Log area provides complete syslog information for the hardware. Information provided within this log includes boot up details and lower level information regarding runtime of the system.



UPDATE LOG

The Update Log shows all recent updates to the Operating System.





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